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Investigation on Chemical Garden Pattern in Hele-Shaw cell by Interfacial Rheology TARO MAEDA, YUICHIRO NAGATSU, Department of chemical engineering, Tokyo University of Agriculture and Technology — Chemical garden is an experiment with precipitation reaction. Precipitation is formed by placing a metal salt such as cobalt chloride in an aqueous solution of sodium silicate. In recent years there have been several reports on pseudo 2D chemical garden experiments in Hele-Shaw cell. We also experimentally investigate the influence of concentration of $CoCl_2$ on chemical garden patterns in Hele-Shaw cell. As the displaced fluid, 3.13 M sodium silicate solution is used, while 0.10˜6.25 M cobalt chloride solution is used for injection liquid. Filament pattern is observed at high concentration, spiral pattern is confirmed at middle concertation and flower pattern is emerged at low concentration. These results are the same as those previously reported. So far, the convincing explanation on the dependence of the patters on the concentration is lacking. We consider the difference originates from the viscoelastic properties of the interfacial solution phase including the precipitation. Therefore, we analyze such influences by performing some interfacial rheological experiments. We find that the result of interfacial LAOS (large amplitude oscillatory shear) measurement is linked to the selection of formed pattern.

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